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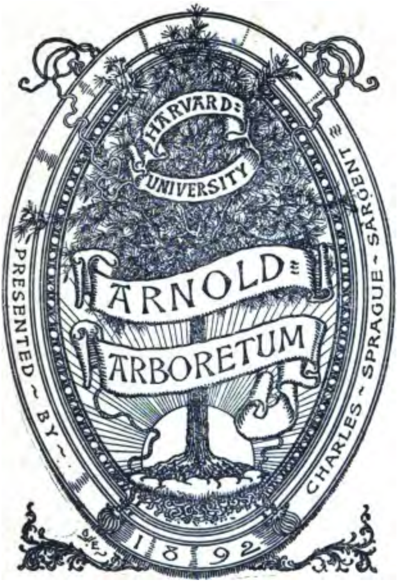
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1892

ON THE

EFFECTS OF PRUNING

ERTAIN CONIFEROUS TREES AND SHRUBS.

By Mr M'NAB,

CURATOR, ROYAL BOTANIC GARDEN.

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ON THE

EFFECTS OF PRUNING CERTAIN CONIFEROUS TREES AND SHRUBS.

My attention was recently directed to a note of a correspondent in an English periodical inquiring if the method of pruning conifers adopted by me is a good one, and requesting to know if I prune Wellingtonias, Deodars, Thujas, also Picea and Abies. The editor remarks that I do prune some trees to induce an upward growth. For the benefit of those wishing information on this subject, I have much pleasure in giving, through the medium of the Botanical Society, some detailed observations on the results of my long experience in pruning Conifers.

The circumstance which first led me to turn my thoughts more directly to this subject, was the rude state in which the Deodar was formerly seen in many nursery establishments throughout the country, and the great difficulty experienced in finding a couple of wellshaped plants to match. Of recent years this difficulty has become less, branch-pruning or fore-shortening being now generally adopted in all well-regulated nurseries.

Deodar Pruning—Beneficial Effects.

There are few species of Coniferous plants on which I would recommend the knife to be used. The Deodar is the one on which I most frequently operate. Other species, however, have been subjected to knife pruning and are hereafter noticed. Many persons are still sceptical about the pruning of the Deodar or any other coniferous tree; one thing, however, is certain, that in no instance of the many thousands of Deodars pruned in the various parts of the country have I seen any bad effects produced. Pruning, no doubt, alters the appearance of the trees; but seedlings, when left to themselves, often produce numerous branches, and many of them have a tendency to assume a leader, and this to such an extent that plants six feet in height frequently measure sixteen feet in circumference, furnished with twenty or thirty leaders. In such plants I generally shorten the branches so as to give them a pyramidal shape, leaving the strongest or most direct leader, and cutting off all the minor ones. When this is done, it will be found that the single leader goes on elongating, and the cut branches begin to ramify, and in time the new-made shoots droop gracefully down all round. It is worthy of remark, that during the memorable winter of 1860–61, when so many conifers and evergreen shrubs were destroyed by the severity of the frost, and the thermometer fell to 8° below zero, many of the large specimens of Deodar suffered considerably, and some were totally killed. I do not consider the death of these plants was so much the result of cold as the want of a judicious and timely pruning beforehand. With the unpruned specimens, the snow, then two feet deep, lay heavy over the extended branches, bending them to such an extent as to cause the bark along the upper surface to crack. The severe frost which immediately followed, while the branches were in a strained position, injured the tissues to such an extent as to cause great harm or death to the plants. On pyramidal or branch-pruned specimens, however, the snow could not lie, and less injury from bending consequently took place. To this circumstance alone I attribute the preservation of nearly all our branch-pruned specimens of Deodar.

Previous to the time when seeds of Deodar were sent to this country in abundance, young plants were extensively propagated by means of cuttings; such cutting-made trees are easily recognised even now, although 20 to 25 feet in height, by their horizontal and somewhat sparse branches, more resembling those of the Cedar of Lebanon than of the Deodar; and many botanists maintain that they are the same species. Nearly all the cutting-made Deodar trees suffered from the severity of the winter 1860–61, although the tree from whence the cuttings were taken was not in the least injured. This original tree in the Edinburgh Botanic Garden is now above 35 feet in height. It was of necessity severely branch-pruned during the year 1856, from the circumstance of the branches interfering with the walks on each side. Besides, the free-growth of the side branches all round so completely stinted the leader, that the diameter of the branches was considerably more than the height. The tree operated on was made to assume a pyramidal shape, and most of the lower branches cut were fully 6 inches in circumference. This Deodar is now in a healthy condition, having a fine symmetrical appearance, covered with young pendant branches all round, and with a good leader. Since 1856 it has been three times slightly dressed all over with a knife. Had this tree not been branch-pruned previous to the snow and frost of 1860–61, it probably would have suffered like all those trees produced by cuttings taken from it, and not previously branch-pruned. Three of the cutting-made trees now exist in the garden, averaging 28 feet in height. They had their branches shortened at the same time with several seedling raised trees, after the large tree just alluded to was found to have sustained no injury. The Deodars raised from cuttings had their horizontal branches shortened from 2 to 4 feet off the main stem, beginning at the bottom and tapering upwards. This pruning reduced the strain while the snow was resting on the lopped branches, and no doubt proved the means of saving them when all the other cutting-made trees were more or less destroyed.

Taste involved in Pruning.

Independently of the substantial plea here given for the pruning of the Deodar, the next consideration is one of taste. If the pruning or pointing of the branches has been commenced at an early stage of the plant's growth, say at 1 foot in height, it is easy to continue pruning imperceptibly, without giving them a stiff appearance; but if not begun till the plants assume the height of 5, 6, 8, or 10 feet (and thousands of unpruned trees of such sizes exist throughout the country), a slight disfigurement for a year or two must take place. The cut branches, however, soon ramify, and give to the plant a conical appearance, which has rather a pleasing effect when standing on grass lawns

Stem-Pruning.

A method practised here with many branch-pruned Deodars, but chiefly for the sake of variety, is the stem-pruning of branch-cut specimens—that is the removal of some of the lower branches, cutting them off in such a way as to leave fully ½ inch of the wood close to the stem. Such cut points should be smoothed over and darkened with clay. The effect of such stem-pruned Deodars standing on grass lawns is graceful; and where several specimens exist, I would strongly recommend one or more of them to be so treated, as it greatly assists in encouraging an upward growth, besides adding variety to the landscape, and is not injurious to the health of the plant.

Stem-pruning need not be practised on the Deodars till they become 8 or 10 feet in height, and when of such a size the stem should be divested of its lower branches, 10 to 18 inches from the ground, according to the height of the tree; as the upward growth of the tree increases, the stem-pruning may be carried to the height of 24 or 30 inches. The effect of the pendant points of the branches round the central stem is, in some circumstances, infinitely more pleasing than seeing the lower branches lying flat on the ground and destroying the grass below.

After pruning the stems of Deodars, as well as all other coniferous trees where the branches to be removed are in close contact with the ground, it will be necessary to lay down soil to cover any roots which may be near the surface, in order to protect them from the sun or frost. Unless this simple treatment is adopted, such stem-pruned trees are liable to sustain injury, and blame may be given to the pruning, and not to the want of this after-treatment, which is absolutely necessary, not only with Conifers, but with all evergreen shrubs requiring to be cut down.

The foregoing remarks have reference to the Deodar as an ornamental tree. Some years ago seeds were introduced in large quantities for the purpose of planting it extensively as a forest tree. This proceeding cannot have answered the end proposed, or we would have heard of results before now. If not succeeding, it cannot be from cold, as we know that the Deodar, under certain circumstances, will endure a great amount of frost, as the pruned specimens did during the winter of 1860–61. It would be advisable for some one to try the branch-pruning system on trees planted for forest culture, and report the result.

With stem-pruned specimens of Coniferous plants, I consider that the bark on the lower part of the stem, when allowed to mature and harden from exposure, is better able to resist cold, and the tree more likely to stand uninjured, than when completely surrounded with branches; besides, from the greatest cold being on the surface of the ground, it is more apt to injure those lying on the surface than those higher up, as happened with some plants of *Cupressus M'Nabiana* during the winter of 1860–61, when stem-pruned specimens were not in the least injured, while the unpruned ones suffered severely.

Another circumstance which I have frequently found to affect the health of certain Coniferous plants is the alternate frosts and thaws we often experience, and which was particularly observed in many places during last winter, when the ground was frozen hard, and sometimes partially covered with snow. A slight thaw took place, which caused the moisture to rest round the base of the stems, as it could not penetrate the frozen mass. The return of frost at night caused this water to freeze again, and permanently injured the bark on the surface of the ground, and which affected the whole plant. When the bark is thoroughly hardened from free exposure, such injury is less liable to happen. To prevent, as far as possible, the occurence of such accidents, Conifers should be planted on somewhat raised mounds if on level ground, while on naturally sloping ground an excess of moisture is less liable to rest round the stems.

The Atlantic cedar *(Cedrus atlantica)* is another coniferous tree which I have branch and stem pruned with success, and it is difficult otherwise to form a well-outlined specimen.

With this plant, branch-pruning should be carried on until the top assumes a fair upright growth. When this takes place, commence to stem-prune as recommended for the Deodar, taking care not to cut too close; the stem-pruning to be continued as the tree gets up. Like the Deodar the Atlantic Cedar has a tendency to form several leaders. The superfluous ones ought to be removed when young, but if this has been neglected, several leaders will not be objectionable if they all show an equal and upright tendency—one, however, is preferable.

Of the Picea genus, I have only operated thoroughly on a few species, such as *P. Nordmanniana*, *P. cephalonica*, *P. Pinsapo*, and *P. Webbiana*. The first of these is inclined to produce strong side-shoots, frequently stinting the growth of the leader to 1½ inches in height per annum. In some plants, ten years old, now growing in the Botanic Garden, Edinburgh, the diameter of the branches is 3 feet 10 inches, while the height of the plant is only 1 foot 10 inches. I have specimens of the *P. Nordmanniana* raised from seed at the same time, and which have been regularly branch-pruned, which are now 4 feet in height, showing the propriety of branch-pruning this species at an early stage. Seedling plants of *P. Nordmanniana* rarely throw out more than one leader, and it is wrong to allow this leader to be robbed by the superabundant growth of the side branches, now that it is shown that no harm arises from a judicious use of the knife. During the period when the *P. Nordmanniana* was scarce, the plants were generally increased by cuttings, grafts, and layers. This pruning was unintentionally the means of causing the leaders of the original plants to assume an upward growth. It is surprising to see many of the early produced plants from cuttings, grafts, and layers, although eighteen or twenty years old, growing procumbent, and, if upright, somewhat fan-shaped. The only way to induce a leader on such plants is to cut off all the branches and peg the stump firmly to the ground. By this means, one, two, or more leaders will be produced from the lower part of the stem. By the removal of all but one, it will in time become a well set leader, and ultimately make a vigorous tree. The leading shoots removed make excellent cuttings or grafts, by retaining their leaders, which is not the case with the points of side branches. The same remarks are applicable to many other species of Picea, when produced by cutting and layers, as *P. nobilis*, *P robusta*, *P. amabilis*, *P. grandis*, *P. Pichta*, &c.

With the Douglas Fir (*Picea Douglasii*) the case is different. Previous to the time when seedlings of this tree were freely produced from the early imported specimens, the Douglas Firs were all struck from cuttings, generally taking the leaders from side or secondary branches. This propagation by cuttings was carried on with vigour for many years, indeed, till some of the original imported trees produced cones, and from that period few or no cuttings have been made. Cutting-struck plants from the original trees were extensively spread over the country, and many of them are now handsome and well-shaped trees. Some of these are at times unwittingly passed off for early seedlings of British-grown trees, and from this circumstance a good deal of discussion about the deterioration of British produced seedlings, as compared with imported ones, has arisen. I am still of opinion, as stated in a paper read before the Botanical Society, that seedlings taken from the earliest cone-producing trees are very inferior to seedlings raised from cones received from their native habittas. All British produced seedlings are easily known from the profusion of resinous blisters all over the surface of the bark, and the naturally light-coloured tint of the foliage. The blisters alluded to are not confined to British seedlings, but are also found on some delicate foreign seedlings—which is, perhaps, the cause of the early stinting and coning of some trees. For my own part, I would not give one cutting-made plant taken from the Bellwood *A. Douglasii* at Perth (and from which many thousand cuttings must have been taken and struck) for any amount of plants produced from the early coning trees. The case, however, is different with seedlings taken from cones produced now for the first time by any of the original imported plants. One of these original trees known to me produced its first cones two years ago. These seedlings are very different from those produced by the early coning trees, being darker in foliage and of slower growth. To my certain knowledge, many of the original seedlings produced by the Lynedoch and Raith trees, where planted in open, exposed places, have entirely passed away, while of those planted in close shady woods, many still exist and appear to thrive.

A common occurrence with some species of Picea is the tendency to produce double leaders; when this is the case, the weaker one can be removed without injury to the plant. I have frequently noticed the destruction of the main leading shoot, caused either by birds, wind, accident, or mischief, and the result has been that the upper whorl of horizontal shoots all gradually assumed an upright habit. It is necessary to remove all but one, selecting the strongest, which will be found to have more of an upright tendency than the others. This shoot will gradually bend over the point where the original leader grew, and although slightly curved in the middle, the top will finally assume an upright position, and this without any necessity for tying. From this branch-made leader the whorls will be produced year by year, with perfect regularity. If the crown of the leader only has been injured, all the incipient side buds on the portion left should be picked out except the one nearest the top: but if the top one is not strong, remove a portion of the injured leader till a vigorous one is reached (judging of this before the incipient buds are picked out). The upper one left will soon form an upright leader, and in a few years will completely obliterate all traces of injury. With *Picea Lowii* such experiments are particularly interesting, although it is very annoying to find the tops of the Piceas maliciously broken off, rendering such experiments necessary.

Picea cephalonica and *P. Pinsapo* are also wonderfully improved by branch pruning, particularly when growing in soils and situations different from what they are accustomed to in their native homes. When growing on limestone rock, as in the case in their native country, it will be found that these trees generally become vigorous and fine shaped.

Picea Webbiana is, perhaps, one of the most ornamental of the Piceas, as far as foliage is concerned. The leaves are long, dark bluish green on the upper surface, and a pure snow white underneath. The young leaf-buds of this tree are very susceptible of injury from spring frost, on this account it is rarely sought after by cultivators, and consequently is sparingly found in nursery establishments. If good plants of *Picea Webbiana* are really desired they must be grown in somewhat shady situations, and operated on at an early stage of their growth, even when 1 or 2 feet in height. The removal of the points of the side shoots year by year, or even the picking out of the lateral buds, has the effect of throwing increased vigour into the terminal leader. By this treatment the terminal bud will be found more robust and stronger than in those specimens where all the points of the branches have been left to grow at freedom, which is very often the case in many garden establishments. When the shoots are numerous they are generally weak,start early into leaf growth, and are certain to be injured by spring frost. When the main and secondary leaders only exist, they seem to have the power of remaining dormant till the proper time arrives for them starting into growth, unless during a very untoward season. Several plants treated as above have now a pyramidal shape, while those left wholly to themselves are generally in a wretched condition.

Of the genus Abies I have attempted the branch-pruning system only on *Abies Pattoniana* and *A. Hookeriana.* These plants have a natural tendency to spread, and to develope numerous leaders. If the side branches are regularly pruned a uniform upright growth will be the result.

Taxodium sempervirens is another Conifer which stands the knife well; its outline may be greatly improved both by branch and stem pruning. The Taxodiun is not so extensively cultivated as it ought to be. If properly attended to by judicious pruning it will become in many parts of England an excellent avenue tree, but the condition in which it is generally seen renders it rather forbidding than otherwise.

Wellingtonia gigantea, whether produced from seeds or cuttings, if growing on good soil, naturally assumes a pyramidal shape. Branch-pruning is not, therefore, necessary except in the case of a stinted specimen, or a wayward branch, as occasionally happens. Wellingtonias, however, may be stem-pruned with impunity. Where many specimens exist, it will be noticed that the upward tendency will be greatly improved by such treatment.

Cupressus Lawsoniana is another tree which I have no hesitation in freely stem-pruning, but not side-branch pruning. In its natural state it grows to the height of 100 feet, but when cultivated in this country it has often a tendency to assume the habit of the *Chinese Arborvitæ*, by putting out numerous upright stems from the surface of the ground, which in many cases finally stint what is intended to be, the leading shoot. I first commenced the stem-pruning of *C. Lawsoniana* during the year 1865, and the progress the stem-pruned plants have made over the unpruned is quite remarkable, and, like the Deodar, totally altering the character of the plant.

Of the genus Pinus, with the exception of *P. excelsa*, no species up to this time has been pruned by me, beyond the removal of any unsightly branch when interfering with a neighbouring specimen. The *Pinus excelsa*, when left to itself, has rather a sprawling habit of growing, the branches in most cases being wide spread, to the detriment of the leading shoot. Trees of *Pinus excelsa* have been branch-pruned here, more or less, for the last twenty-five years. Such plants so treated have now assumed the habit of *Pinus Cembra*. The *Pinus excelsa* is rarely asked for by cultivators; but if planted and treated as recommended, it will prove an ornament to the pinetum or shrubbery, its long, light coloured leaves contrasting admirably with the foliage of the generality of the dark-leaved pines.

Several other species of Coniferous trees are now under the process of branch and stem pruning, but it is premature to report on them till the practice has been thoroughly tested by experiment.

When pruning Coniferous trees I generally commence in the month of August, and continue the operation till the middle or end of October. Some have been pruned as late as December and January without any apparent injury, but this may depend on the effect of the weather, particularly frost, on the newly cut extremities. As a general rule I prefer the earlier months stated.

Conifers in a state of nature rarely grow singly as we are accustomed to see them in gardens and pleasure grounds. They generally occur in large forests, where, from their close growth, the lower branches are destroyed, and from this circumstance the trees of necessity assume an upright habit. To produce characteristic specimens, we must therefore endeavour to imitate nature and induce in some plants a tree growth, instead of a bush form, which is not their natural condition.

I have stated that certain Coniferous plants are not in the least injured by a free use of the knife, while others, it is well known, will not bear it in the slightest degree. The Araucaria is very susceptible of injury if its juices are interfered with, either by cutting or bending, and I feel almost persuaded that the serious injury done to the Araucarias during the severe winter of 1860–61, was in a great measure due to the excessive bending of the points of the branches under the weight of snow which fell at the time, thus rupturing the upper tissues close to the stem, and thereby exposing them to the severe frost which at that time prevailed, aided, no doubt, by the long continued moist autumn which preceded. Injury is often recklessly done to the tops of Araucarias by breaking them off, as is well known to nurserymen. With such mutilated plants, one of the side shoots composing the upper whorl is not unfrequently tied upright so as to form a leader. Instead of tying up one of these side branches, a slight bending down of the upper whorl of branches is preferable; by doing so, two or more leaders will be produced from the centre. The superfluous ones are to be removed, not by direct cutting off, but by twisting a piece of very fine wire tightly round them, leaving the strongest one untouched. This wire will cut them through in a short time; they can then be removed without injuring the plant. The shoot untouched will soon become a good leader. If a leader is formed by the tying up of a side branch, it will be difficult for such a plant ever to assume a symmetrical shape.

At the beginning of this paper I stated that other trees and shrubs, besides the Deodar, had been saved during the winter of 1860–61, owing to the condition they were in from hand-pruning during a series of years. In this garden it is customary every autumn to trim with a knife certain shrubs, particularly Portugal laurels and evergreen oaks, not destined for tree growth, so as to keep them within a limited space and of a globular shape. Singularly enough, most of the knife-pruned Portugal laurels in the garden were uninjured, while the unpruned specimens, from 10 to 18 feet in height, were more or less damaged to within 3 or 4 feet of the ground. The hand-pruned evergreen oaks likewise survived, while the unpruned ones were in many cases seriously injured, but sprung up freely from the lower parts of the stem.

For the benefit of those who object to the pruning of evergreen shrubs, I may state that, from the experience gained during the winter of 1860–61, I continue this practice year by year. With the pruned specimens of Portugals and evergreen oaks, the tops were compact and rounded, and the snow rested on them while with the unpruned shrubs the branches were very much bent under the weight of snow.

Other plants might be enumerated, but enough has been said to prove that knife-pruning is not always objectionable in the case of Conifers and evergreen shrubs, particularly when we find that it is sometimes a safeguard, while plants of the same species are injured under circumstances over which we have no control.

The accompanying woodcuts, which appeared in the Gardener's Chronicle, February 10, 1872, p. 179, will serve to illustrate the general effects of pruning Conifers. Fig. 1 represents a seedling-raised tree of the *Cedrus Deodara*, which has been branch and stem pruned, showing a clear space between the lower branches and the surface of the ground. Fig. 2 is intended to represent a Deodar branch pruned only, leaving the lower branches lying

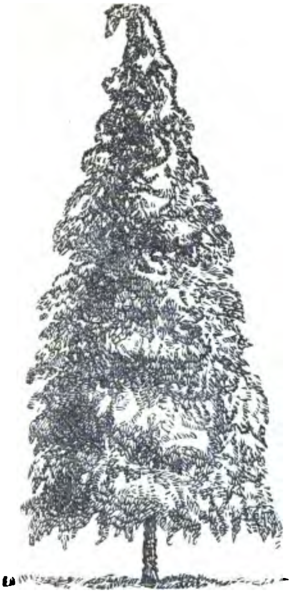

Fig. 1.

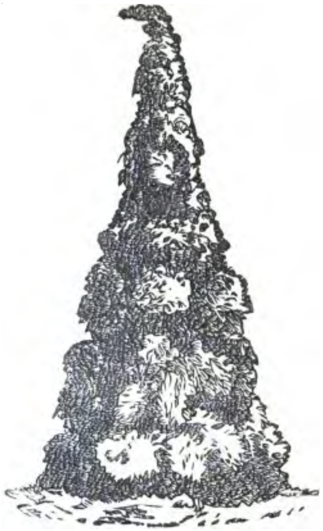

Fig. 2.

flat on the surface of the soil. Fig. 3 represents a seedling-raised Deodâr which has never been touched by

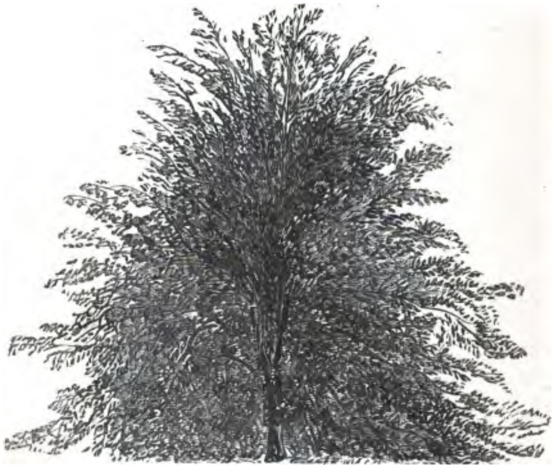

Fig. 3.

the knife, and where the vigour of the numerous side branches have completely weakened the leader. Fig. 4 represents a cutting-made Deodar, the branches of which

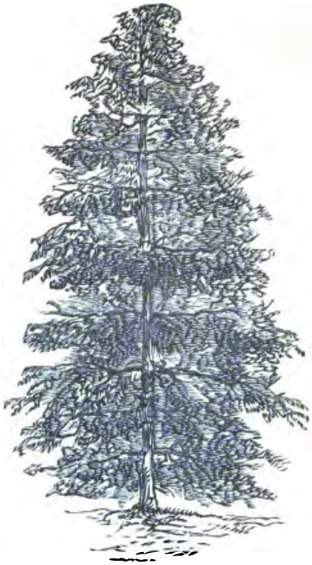

Fig. 4.

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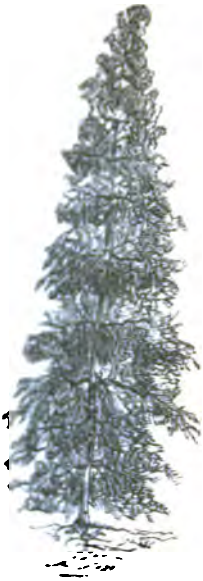

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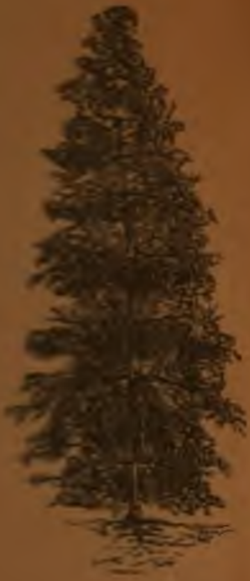

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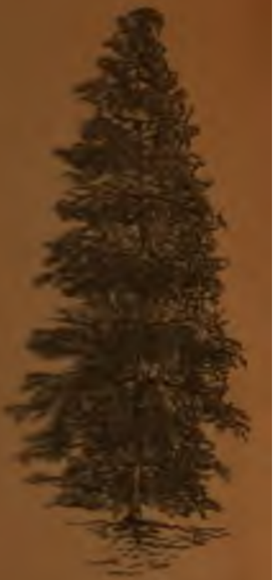

Fig. 1

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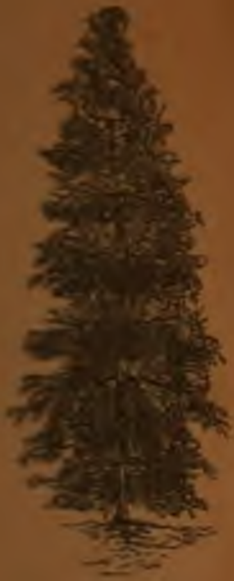

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